Professor Vishwanathan Iyer's

HERAMB COACHING CLASSES

Yogeshwar Tower, Katemanivili, Kalyan (East)

XII/MATHS **MARKS: 80** **DURATION: 3 HOUR**

DATE: 28/12/18 **PART ONE**

Q.1 Attempt any six: **(12)**

(i) Write the negation of the following (a) Some politician are corrupt.
(b) Ram is hardworking and intelligent.

(ii) If A= $\begin{pmatrix}1 & 2\\ 3 & 4\end{pmatrix}$ and X is a2x2 matrix such that AX=I; find X.

(iii) If $A=\begin{bmatrix}1 & 2 & 3\\ 2 & a & 2\\ 5 & 7 & 3\end{bmatrix}$ is a singular matrix then find a.

(iv) If y=$\sin^{-1}\left(\frac{2x}{1+x^2}\right)$, find the $\frac{dy}{dx}$.

(v) If $x^3+y^7=(x+y)^{10}$ then find $\frac{dy}{dx}$.

(vi) Evaluate $\int X\tan^{-1}X\,dx$.

(vii) Evaluate $\int_0^1 \frac{1}{1+x^2}dx$.

(viii) Find the $\frac{dy}{dx}$ for $x^2+y^2=xy$.

Q.2 (A) Attempt any two: **(6)**

(a) Examine the statement pattern is tautology , contradiction or contingency $(\sim p\rightarrow q)\leftrightarrow(p\rightarrow q)$.
(b) Write the dual of the following:
(i) Chetan has black hair and blue eyes.
(ii) Mark is a teacher or Erik is a doctor.
(c) Find the elasticity of demand, if the marginal revenue is 50 and price is Rs.75/.

Q.2 (B) Attempt any two: **(8)**

(i) If $A=\begin{bmatrix}2 & -2\\ 3 & 4\end{bmatrix}$ then find the inverse by adjoint method.

(ii)Find the $\frac{dy}{dx}$ for $=x^x+5+5^x+x^5$.
(iii) The total cost function is $C=100+600x-3x^2$ .Find the values of x for which total cost is decreasing.

Q.3 (A) Attempt any two: **(6)**

(i) Evaluate $\int e^x\sin x\,d$.

(ii) Evaluate $\int_0^1 \frac{x^2+3x+2}{\sqrt{x}}\,dx$.

(iii) Divide 60 into two parts such that the product of square of one part and the other is maximum.

Q.3 (B) Attempt any two: **(8)**

(i) Write the converse, inverse and contrapositive of the given statement "The crop will be destroyed if there is a flood.

(ii) $for\ A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}\ find\ A^2$+3A.

(iii) Find the area of the curve $y^2 = 4$ and the line $x = 3$.

PART TWO

Q.1 Attempt any six: **(12)**

(i) What must be subtracted from each of the following 5,7and10, so that the resulting numbers are in continued proportion?

(ii) Compute the CDR of a city with total number of death 812 in a year out of total annual population 80,000.

(iii) Two numbers within bracket denote the rank in two subject (1,1), (2,10), (3,3), (4,4), (5,5), (6,7), (7,2), (8,6), (9,8), (10,9) find the rank correlation coefficient.

(iv) Coefficient of correlation between the variables X and Y is 0.3 and their covariance is 12. The variance of X is 9, find the standard deviation of Y.

(v) Sketch the graph for $4x + 5y \leq 40$.

(vi) Find the accumulated value of Rs.400 made annually for three years at interest rate 8% compounded annually. [$(1.08)^3$=1.2597]

(vii) If the present worth of a bill due six month hence is Rs.2500 at 10% p.a., what is he sum due?

(viii) The present worth of sum rs.5,830 due 9 months hence is rs.5,500. Find the rate of interest.

Q.2 (A) Attempt any two: **(6)**

(i) A wholesaler allows 25% trade discount and 5% cash discount. What will be the net price of an article at Rs.1,600.

(ii) Compute CDR for district A and B:

Age group	**District A**		**District B**	
	Population	**Death**	**Population**	**Death**

Below 15	800	32	900	12
15-25	3000	12	1500	8
25-65	4800	48	4500	38
65 and above	1400	42	600	30

(iii) Given $l_{26} = 9046$, $l_{27} = 8898$ *and* $T_{26} = 36000$ find the values of L_{26} , T_{27} *and* e_{26}^{0} .

Q.2 (B) Attempt any two: **(8)**

(i) The income of agent remains unchanged though the rate of commission is increased from 5% to 6.5%. Find the percentage reduction in the value of the business.

(ii) Find the coefficient of correlation between X and Y:

X	1	2	3	4	5	6	7	8	9
Y	12	11	13	15	14	17	16	19	18

(iii) A job production unit has four jobs which manufactured by four machine, the processing cost of each job for each machine is given below: (MAXIMIZE)

jobs	**Machine P**	**Machine Q**	**Machine R**	**Machine S**
A	31	25	33	29
B	25	24	23	21
C	19	21	23	24
D	38	36	34	40

Q.3 (A) Attempt any two: **(6)**

(i) Obtain the two regression equations for given data:

X	11	7	9	5	8	6	10
Y	10	8	6	5	9	7	11

(ii) Find the accumulated value of annuity due of Rs.500 p.a. for 3 years at 10% p.a. compounded annually. Given $(1.1)^3 = 1.331$.

(iii)What must be subtracted from each of the following 5, 7, and 10, so that the resulting numbers are in continued proportion?

Q.3 (B) Attempt any two: **(8)**

(i) The two regression equation are$2x + 3y = 6$ *and* $5x + 7y = 12$ find the mean values of x and y .Also find r.

(ii) Find the sequence that minimize total elapsed time also find idle time on both machine:

Job	1	2	3	4	5	6	7
M_1	3	12	15	6	10	11	9
M_2	8	10	10	6	12	1	3

(iii) Solve the following L.P.P. by graphical method

Max (z)$= 25x + 20y, s.t. 3x + 2y \leq 1800, 2x + 7y \leq 1400, x \leq 350$, $y \leq 150, x, y \geq 0$.

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